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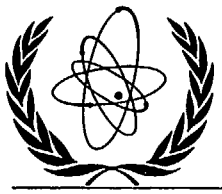

INTERNATIONAL ATOMIC ENERGY AGENCY

NUCLEAR DATA SERVICES

DOCUMENTATION SERIES OF THE IAEA NUCLEAR DATA SECTION

UKFY2

The UK Fission Product Yield Library

Version 2, 1991

Summary Documentation

Abstract: The UKFY2 Fission Product Yields Library contains 7 files with fission yield information in different formats and references, as received at the IAEA Nuclear Data Section in February 1991. File 2 contains the complete set of adjusted independent and cumulative yields in ENDF-6 format as adopted for the JEF-2 fission product yield file. It contains yields for 21 different fissioning nuclides. Many more chain yield and fractional yield sets are given in tabular form in other files of this library. The data are available costfree on magnetic tape from the IAEA Nuclear Data Section.

M. Lammer

April 1991

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1. Introduction

The UKFY2 Fission Product Yields Library contains 7 files with fission yield information in different formats and references, with a total size of 85,029 lines. Details on the contents of the library (tape) and the individual files are given on the following pages.

File 2 contains the complete set of adjusted independent and cumulative yields in ENDF-6 format as adopted for the JEF-2 fission product yield file. It includes yields from thermal, fast and (in some cases, see page 3) also 14 Mev neutron and spontaneous fission for 21 different fissioning nuclides.

Files 3 to 7 contain tables of all available experimental data and evaluated chain and fractional yields as well as tables of yields where measured data are discrepant, sparse or non-existent, and references to the experiments. Files 3 and 4 give recommended yields only where experimetal data are available, prior to the adjustment procedures applied to the final yield sets in file 2. Also, some yields are tabulated for target - neutron energy combinations not contained in file 2. The tables are given in user friendly format, as reproduced in printed form in the reports AEA-TRS-1015,1018 and 1019. These reports contain also a detailed documentation and description of the yield library and evaluation procedures.

The tape with the UKFY2 library was received in February 1991 at the IAEA Nuclear Data Section, from where the data are available costfree on magnetic tape upon request.

2. Contents of Tape: United Kingdom Fission product file no 2

	char per record	no of lines
File 1: Table of contents of tape	80	42
File 2: UKFY2; Adjusted independent and cumulative yields. In ENDF-6 format. Described in [1].	80	56450
File 3: Chain yield tables from [2].	132	17047
File 4: Fractional independent yield tables from [2].	132	2810
File 5: Chain yield discrepancy tables from [3].	80	5564
File 6: Fractional independent yield discrepancy tables from [3]	80	332
File 7: References from [2] and [3].	80	2784
Total library		85029

Note: 1) The tables in files 3 to 7 are in user friendly format as reproduced in references [2] and [3].

2) All references to ^{242}Am refer to the long lived metastable state (T1/2 $\simeq$ 150 y).

References:

A New Evaluation of Fission Product Yields and the Production of a New Library (UKFY2) of Independent and Cumulative Yields,
M.F.James, R.Mills and D.R.Weaver:

[1] Part I. Methods and Outline of the Evaluation, Report AEA-TRS-1015

[2] Part II. Tables of Measured and Recommended Fission Yields, Report AEA-TRS-1018

[3] Part III. Tables of Fission Yields with Discrepant or Sparse Data, Report AEA-TRS-1019.

Originators of this evaluation (completed 15 January 1991):

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3. File 2: Adjusted independent and cumulative yields

(in ENDF-6 format)

The following introduction applies to all yield sets included in the file:

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UKFY2 TAPE 24 (FISSION YIELDS)
*               *               *               *               *
90-TH-232 WIN         EVAL-JAN91 M.JAMES AND R.MILLS
                       DIST-FEBxx                          910201
----UKFY2              MATERIAL 9040
----NEUTRON-INDUCED FISSION PRODUCT YIELDS
----ENDF-6 FORMAT
----ADJUSTED INDEPENDENT AND CUMULATIVE YIELD LIBRARIES
----TERNARY FISSION AND ISOMERIC SPLITTING INCLUDED
----DESCRIBED WITHIN REPORTS AEA-TRS-1015, 1018 AND 1019.
----THIS WORK WAS SPONSORED BY THE UKAEA, BNF PLC AND NUCLEAR
----ELECTRIC.  THIS REMAINS THE JOINT PROPERTY OF THE SPONSORS
----BUT CAN BE DISTRIBUTED FREELY.  NO LIABILITY CAN BE ACCEPTED
----BY THE SPONSORS FOR THE USE, OR MISUSE, OF THIS DATA.
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Contents of File 2:

MAT	target	yield type	neutron energy	no. of yield values
9040	Th-232	independent	fast (0.4 MeV)	934
			14 MeV	1043
		cumulative	fast (0.4 MeV)	934
			14 MeV	1043
9222	U-233	independent	thermal	1005
			fast (0.4 MeV)	991
			14 MeV	1167
		cumulative	thermal	1005
			fast (0.4 MeV)	991
			14 MeV	1167
9225	U-234	independent	fast (0.4 MeV)	988
		cumulative	fast (0.4 MeV)	988
9228	U-235	independent	thermal	977
			fast (0.4 MeV)	951
			14 MeV	1138
		cumulative	thermal	977
			fast (0.4 MeV)	951
			14 MeV	1138
9231	U-236	independent	fast (0.4 MeV)	1018
		cumulative	fast (0.4 MeV)	1018
9237	U-238	independent	fast (0.4 MeV)	1098
			14 MeV	1147
		cumulative	fast (0.4 MeV)	1098
			14 MeV	1147
9346	Np-237	independent	thermal	1033
			fast (0.4 MeV)	1035
		cumulative	thermal	1033
			fast (0.4 MeV)	1035

Contents of File 2 (continued):

MAT	target	yield type	neutron energy	no. of yield values
9349	Np-238	independent	thermal	1039
			fast (0.4 MeV)	1041
		cumulative	thermal	1039
			fast (0.4 MeV)	1041
9434	Pu-238	independent	thermal	1029
			fast (0.4 MeV)	1034
		cumulative	thermal	1029
			fast (0.4 MeV)	1034
9437	Pu-239	independent	thermal	1071
			fast (0.4 MeV)	1070
		cumulative	thermal	1071
			fast (0.4 MeV)	1070
9440	Pu-240	independent	fast (0.4 MeV)	1070
		cumulative	fast (0.4 MeV)	1070
9443	Pu-241	independent	thermal	1106
			fast (0.4 MeV)	1084
		cumulative	thermal	1106
			fast (0.4 MeV)	1084
9446	Pu-242	independent	fast (0.4 MeV)	1107
		cumulative	fast (0.4 MeV)	1107
9543	Am-241	independent	thermal	1085
			fast (0.4 MeV)	1098
		cumulative	thermal	1085
			fast (0.4 MeV)	1098
9547	Am-242m	independent	thermal	1102
			fast (0.4 MeV)	1096
		cumulative	thermal	1102
			fast (0.4 MeV)	1096
9549	Am-243	independent	thermal	1115
			fast (0.4 MeV)	1115
		cumulative	thermal	1115
			fast (0.4 MeV)	1115
9631	Cm-242	independent	spontaneous	1071
		cumulative	spontaneous	1071
9634	Cm-243	independent	thermal	1096
			fast (0.4 MeV)	1105
		cumulative	thermal	1096
			fast (0.4 MeV)	1105
9637	Cm-244	independent	spontaneous	1100
			thermal	1124
			fast	1124
		cumulative	spontaneous	1100
			thermal	1124
			fast	1124
9640	Cm-245	independent	thermal	1133
			fast (0.4 MeV)	1134
		cumulative	thermal	1133
			fast (0.4 MeV)	1134
9861	Cf-252	independent	spontaneous	1247
		cumulative	spontaneous	1247

4. Contents of File 3: Chain yield tables

Contents of File 3 (continued)
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Contents of File 3 (continued)
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5. Contents of File 4: Fractional independent yield tables

TABLE	1	ENERGY:THERMAL	NUCLIDE:TH-229
TABLE	2	ENERGY:THERMAL	NUCLIDE:U -233
TABLE	3	ENERGY:THERMAL	NUCLIDE:U -235
TABLE	4	ENERGY:THERMAL	NUCLIDE:NP-237
TABLE	5	ENERGY:THERMAL	NUCLIDE:PU-238
TABLE	6	ENERGY:THERMAL	NUCLIDE:PU-239
TABLE	7	ENERGY:THERMAL	NUCLIDE:PU-241
TABLE	8	ENERGY:THERMAL	NUCLIDE:AM-241
TABLE	9	ENERGY:THERMAL	NUCLIDE:AM-242
TABLE	10	ENERGY:THERMAL	NUCLIDE:CM-245
TABLE	11	ENERGY:THERMAL	NUCLIDE:CF-249
TABLE	12	ENERGY:FAST	NUCLIDE:TH-232
TABLE	13	ENERGY:FAST	NUCLIDE:U -235
TABLE	14	ENERGY:FAST	NUCLIDE:U -236
TABLE	15	ENERGY:FAST	NUCLIDE:U -238
TABLE	16	ENERGY:FAST	NUCLIDE:NP-237
TABLE	17	ENERGY:FAST	NUCLIDE:PU-239
TABLE	18	ENERGY:FAST	NUCLIDE:PU-240
TABLE	19	ENERGY:HIGH	NUCLIDE:TH-232
TABLE	20	ENERGY:HIGH	NUCLIDE:U -233
TABLE	21	ENERGY:HIGH	NUCLIDE:U -235
TABLE	22	ENERGY:HIGH	NUCLIDE:U -238
TABLE	23	ENERGY:HIGH	NUCLIDE:PU-239
TABLE	24	ENERGY:HIGH	NUCLIDE:AM-241
TABLE	25	ENERGY:SPONT.	NUCLIDE:CM-244
TABLE	26	ENERGY:SPONT.	NUCLIDE:CF-252
TABLE	27	ENERGY:SPONT.	NUCLIDE:FM-254

6. Contents of File 5: Chain yield discrepancies tables

TABLE 1: 90-TH-227 ,NEUTRON ENERGY:THERMAL.
TABLE 2: 90-TH-229 ,NEUTRON ENERGY:THERMAL.
TABLE 3: 92-U -233 ,NEUTRON ENERGY:THERMAL.
TABLE 4: 92-U -235 ,NEUTRON ENERGY:THERMAL.
TABLE 5: 93-NP-237 ,NEUTRON ENERGY:THERMAL.
TABLE 6: 94-PU-238 ,NEUTRON ENERGY:THERMAL.
TABLE 7: 94-PU-239 ,NEUTRON ENERGY:THERMAL.
TABLE 8: 94-PU-241 ,NEUTRON ENERGY:THERMAL.
TABLE 9: 95-AM-241 ,NEUTRON ENERGY:THERMAL.
TABLE 10: 95-AM-242 ,NEUTRON ENERGY:THERMAL.
TABLE 11: 96-CM-243 ,NEUTRON ENERGY:THERMAL.
TABLE 12: 96-CM-245 ,NEUTRON ENERGY:THERMAL.
TABLE 13: 98-CF-249 ,NEUTRON ENERGY:THERMAL.
TABLE 14: 98-CF-251 ,NEUTRON ENERGY:THERMAL.
TABLE 15: 99-ES-254 ,NEUTRON ENERGY:THERMAL.
TABLE 16:100-FM-255 ,NEUTRON ENERGY:THERMAL.
TABLE 17: 94-PU-239 ,NEUTRON ENERGY:EPI-THERMAL
TABLE 18: 90-TH-232 ,NEUTRON ENERGY:FAST.
TABLE 19: 91-PA-231 ,NEUTRON ENERGY:FAST.
TABLE 20: 92-U -232 ,NEUTRON ENERGY:FAST.
TABLE 21: 92-U -233 ,NEUTRON ENERGY:FAST.
TABLE 22: 92-U -235 ,NEUTRON ENERGY:FAST.
TABLE 23: 92-U -236 ,NEUTRON ENERGY:FAST.
TABLE 24: 92-U -238 ,NEUTRON ENERGY:FAST.
TABLE 25: 93-NP-237 ,NEUTRON ENERGY:FAST.
TABLE 26: 93-NP-238 ,NEUTRON ENERGY:FAST.
TABLE 27: 94-PU-238 ,NEUTRON ENERGY:FAST.
TABLE 28: 94-PU-239 ,NEUTRON ENERGY:FAST.
TABLE 29: 94-PU-240 ,NEUTRON ENERGY:FAST.
TABLE 30: 94-PU-241 ,NEUTRON ENERGY:FAST.
TABLE 31: 94-PU-242 ,NEUTRON ENERGY:FAST.
TABLE 32: 95-AM-241 ,NEUTRON ENERGY:FAST.
TABLE 33: 95-AM-242 ,NEUTRON ENERGY:FAST.
TABLE 34: 96-CM-243 ,NEUTRON ENERGY:FAST.
TABLE 35: 96-CM-244 ,NEUTRON ENERGY:FAST.
TABLE 36: 96-CM-245 ,NEUTRON ENERGY:FAST.
TABLE 37: 96-CM-246 ,NEUTRON ENERGY:FAST.
TABLE 38: 96-CM-248 ,NEUTRON ENERGY:FAST.
TABLE 39: 98-CF-249 ,NEUTRON ENERGY:FAST.
TABLE 40: 98-CF-252 ,NEUTRON ENERGY:FAST.
TABLE 41: 90-TH-232 ,NEUTRON ENERGY:HIGH.
TABLE 42: 91-PA-231 ,NEUTRON ENERGY:HIGH.
TABLE 43: 92-U -233 ,NEUTRON ENERGY:HIGH.
TABLE 44: 92-U -235 ,NEUTRON ENERGY:HIGH.
TABLE 45: 92-U -238 ,NEUTRON ENERGY:HIGH.
TABLE 46: 93-NP-237 ,NEUTRON ENERGY:HIGH.
TABLE 47: 94-PU-239 ,NEUTRON ENERGY:HIGH.
TABLE 48: 94-PU-240 ,NEUTRON ENERGY:HIGH.
TABLE 49: 94-PU-242 ,NEUTRON ENERGY:HIGH.
TABLE 50: 95-AM-241 ,NEUTRON ENERGY:HIGH.
TABLE 51: 90-TH-232 ,NEUTRON ENERGY:SPONTANEOUS
TABLE 52: 92-U -238 ,NEUTRON ENERGY:SPONTANEOUS
TABLE 53: 94-PU-240 ,NEUTRON ENERGY:SPONTANEOUS
TABLE 54: 94-PU-242 ,NEUTRON ENERGY:SPONTANEOUS
TABLE 55: 96-CM-242 ,NEUTRON ENERGY:SPONTANEOUS
TABLE 56: 96-CM-244 ,NEUTRON ENERGY:SPONTANEOUS
TABLE 57: 96-CM-246 ,NEUTRON ENERGY:SPONTANEOUS
TABLE 58: 96-CM-248 ,NEUTRON ENERGY:SPONTANEOUS

Contents of File 5 (continued)

7. Contents of File 6: Fractional independent yield discrepancy tables

TABLE	1	ENERGY:THERMAL	NUCLIDE:TH-229
TABLE	2	ENERGY:THERMAL	NUCLIDE:U -233
TABLE	3	ENERGY:THERMAL	NUCLIDE:U -235
TABLE	4	ENERGY:THERMAL	NUCLIDE:NP-237
TABLE	5	ENERGY:THERMAL	NUCLIDE:PU-238
TABLE	6	ENERGY:THERMAL	NUCLIDE:PU-239
TABLE	7	ENERGY:THERMAL	NUCLIDE:PU-241
TABLE	8	ENERGY:THERMAL	NUCLIDE:AM-241
TABLE	9	ENERGY:THERMAL	NUCLIDE:AM-242
TABLE	10	ENERGY:THERMAL	NUCLIDE:CM-245
TABLE	11	ENERGY:THERMAL	NUCLIDE:CF-249
TABLE	12	ENERGY:FAST	NUCLIDE:TH-232
TABLE	13	ENERGY:FAST	NUCLIDE:U -235
TABLE	14	ENERGY:FAST	NUCLIDE:U -236
TABLE	15	ENERGY:FAST	NUCLIDE:U -238
TABLE	16	ENERGY:FAST	NUCLIDE:NP-237
TABLE	17	ENERGY:FAST	NUCLIDE:PU-239
TABLE	18	ENERGY:FAST	NUCLIDE:PU-240
TABLE	19	ENERGY:HIGH	NUCLIDE:TH-232
TABLE	20	ENERGY:HIGH	NUCLIDE:U -233
TABLE	21	ENERGY:HIGH	NUCLIDE:U -235
TABLE	22	ENERGY:HIGH	NUCLIDE:U -238
TABLE	23	ENERGY:HIGH	NUCLIDE:PU-239
TABLE	24	ENERGY:HIGH	NUCLIDE:AM-241
TABLE	25	ENERGY:SPONT.	NUCLIDE:CM-244
TABLE	26	ENERGY:SPONT.	NUCLIDE:CF-252
TABLE	27	ENERGY:SPONT.	NUCLIDE:FM-254

8. Contents of File 7: References for the experimental data base

1) References from the Crouch Database compiled by E.A. CROUCH (last addition: 1981):

   References 1 to 1190

2) Extension of Crouch's reference list by Julius Banai

   References 1191 to 1206

3) Entries from literature search (1988). Data added to database by M.F.James and R.W.Mills:

   References 2000 to 2061

4) Exfor Fission yield database references from Saclay March 1988. Data added to database by M.F.James and R.Mills. Updated from NEA Databank Saclay 6th Oct 1989:

   List of EXFOR entries (given are: accession number, main reference and authors) used in the data base.